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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Hans J. Hug

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EXAMINER

LARKIN, DANIEL SEAN

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,690	Applicant(s) HUG ET AL.	
	Examiner DANIEL S. LARKIN	Art Unit 2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-27 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 10-15 and 17-27 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4 May 2006; 24 July 2007 & 15 January 2009</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The disclosure is objected to because of the following informalities:

Page 1, lines 2-3: Reference to the claims within the specification should be deleted.

Page 3, line 16: Reference to the claims within the specification should be deleted.

Page 6, line 9: The article -- a -- should be inserted prior to the term "recessed".

Page 6, line 26: The term -- one -- should be inserted after the term "enables".

Page 7, line 9: The first occurrence of the article "the" should be deleted.

Page 8, line 11: The article -- the -- should be inserted prior to the term "case".

Page 8, line 14: The article -- the -- should be inserted prior to the term "cantilever".

Page 9, lines 11, 13, and 18: Each of the "commas" should be replaced with a -- semicolon --.

Page 13, line 6: The term -- to -- should be inserted prior to the term "maintain".

Page 14, line 8: Reference numeral "123" should be corrected to read -- 123c --.

Page 15, line 24: The term "edge" should be corrected to read -- edges --.

Page 17, line 4: The term “edge” should be corrected to read -- edges --.

Page 18, line 17: The term “said” should be deleted. Appropriate correction is required.

Claim Objections

3. Claims 10-22 are objected to because of the following informalities:

Re claim 1, claim lines 9 and 12: The article -- a -- should be inserted prior to the term “direction”.

Re claim 14, claim line 2: The phrase “the back side of the cantilever tip” lacks antecedent basis. The back side of the cantilever, claim 10, line 3, has only previously been recited.

Re claim 15, claim lines 2 and 3: The phrase “the back side of the cantilever tip” lacks antecedent basis. The back side of the cantilever, claim 10, line 3, has only previously been recited.

Re claim 17, claim lines 2 and 3: The third occurrence of the article “the” or the term “said” should be deleted.

Re claim 17, claim line 3: The article -- a -- should be inserted prior to the term “direction”.

Re claim 19, claim line 3: The second occurrence of the article “the” or the term “said” should be deleted.

Re claim 21, claim lines 9 and 12: The article -- a -- should be inserted prior to the term “direction”.

Re claim 21, claim line 14: The phrase “the back side of the cantilever tip” lacks antecedent basis. The back side of the cantilever, claim 21, line 3, has only previously been recited.

Re claim 22, claim line 11: A -- comma -- should be inserted after the term “support”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 18, 21, 22, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claims 18 and 24, claim lines 1 and 2: It is not clear what is meant by “partly octagonal” because this term doesn’t clearly define how many side “partly-octagonal” is supposed to represent. Is any polygon deemed to be “partly-octagonal”? As shown in the Figure 2 of applicants’ specification, the support (120) appears to be an irregular hexagon.

Re claim 21, claim lines 1-16: It is not clear what type of claim is being presented. The preamble recites a “process for manufacturing a cantilever assembly for scanning a sample”; however, claim lines 2-13 (i.e. the body of the claim) reads as an apparatus claim similar to apparatus claim 10. Then, claim lines 13-16 present

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process limitations. Thus, it is not clear if applicants are claiming a method claim or an apparatus claim (*Ex parte Lyell*, 17 USPQ2d 1548).

Re claim 21, claim lines 13 and 14: The phrase “applying from a source of a high reflectance material the area of the high reflectance material and the sloping boundary” does not make sense.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 23 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,753,912 (Matsuyama).

With respect to claims 23 and 24, Matsuyama discloses a cantilever chip comprising a support section (4) for supporting a cantilever (6). The support section has a recessed portion (16) narrowing in the direction towards the cantilever. Additionally, in an alternative embodiment, Figure 3D, the recessed portion of the support body is shaped as an irregular hexagon, which is deemed to represent Applicants claimed partly-octagonal shape, given that Applicants' disclosed shaped has is also an irregular hexagon.

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8. Claims 10, 17, 21, 23, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,245,863 (Kajimura et al.).

With respect to the limitations of claims 10 and 21, Kajimura et al. disclose an atomic force microscope and method of manufacturing one, comprising: a cantilever assembly for scanning a sample (12), comprised of: a cantilever (16) having a cantilever tip (14), the cantilever being mounted to a rigid support (17) and being provided with an area (18) of high reflectance material on the back side of the cantilever. The area (18) appears to have a boundary sloping towards the support (17) which fulfills the condition the area of the high reflectance material divided by the area of the sloping boundary area is greater than one, see Figure 1. The area of high reflectance is created by a source containing material having a high reflectance.

With respect to the limitations of claims 17 and 23, Kajimura et al. appear to shown, Figure 1, that the portion of the support (17) to which the cantilever (16) is attached has a recessed shaped which narrows in a direction towards the cantilever.

With respect to the limitations of claim 25, Kajimura et al. disclose an area (18) of high reflectance material on the back side of the cantilever facing away from a sample. The area (18) also appears to have a boundary sloping towards the support (17).

9. Claim 26 is rejected under 35 U.S.C. 102(b) as being anticipated by US 6,365,895 (Yamamoto).

Yamamoto discloses an apparatus for measuring a micro surface configuration utilizing a cantilevered probe (1). The probe is formed of a single material and

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comprises a pointed tip section (1a), a beam portion (1b), and a proximal portion (1c) that is mounted to a support table (4). As shown in the figures, the proximal portion (1c) of the cantilevered probe (1) has a thickness that is substantially greater than the thickness of the beam portion (1b).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 11-13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,245,863 (Kajimura et al.) in view of "Small Cantilevers for Force Spectroscopy of Single Molecules" (Viani et al.).

With respect to the limitations of claims 11-13, Kajimura et al. disclose all of the limitations of the base claim, but fail to disclose a cantilever or a area of high reflectance material of the size claimed.

Viani et al. disclose a process whereby small rectangular cantilevers are fabricated from silicon nitride. Viani et al. disclose that the cantilevers fabricated have a length of 9-50 micrometers and metallic reflector pads have been added to the cantilever ends to maximize reflectivity. Although the article to Viani et al. fails to expressly disclose the size of the reflector pad, the examiner argues that with a cantilever having a length of nine micrometers, naturally, the reflector pad would have a

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area of reflectance less than ten micrometers. Providing a "small" cantilever would have been obvious to one of ordinary skill in the art because it is well known in the art that small cantilevers have higher resonant frequencies than larger cantilevers, while simultaneously providing the same spring constants.

12. Claims 14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,245,863 (Kajimura et al.) in view of US 5,319,961 (Matsuyama et al.).

With respect to the limitations of claims 14 and 20, Kajimura et al. disclose all of the limitations of the base claim, but fail to disclose that the support provided with a sharp edge that is located a distance from a back side of the cantilever tip, the distance being determined such that during application of the reflectance material the area on the back side of the cantilever tip and the sloping boundary are formed on a support having at least two steps and wherein the edge of the second step does not obstruct application of the high reflectance material.

Matsuyama et al. disclose a cantilever chip for use in scanning probe microscopes, comprising: a cantilever (16) attached to a substrate (12). In one embodiment, as shown in Figure 2J, the substrate (12) is provided with a sharp edge having at least two steps that is located a distance from a back side of the cantilever tip. The arrangement of the support would appear to allow formation of a reflectance material on the back side of the cantilever above the cantilever tip. Providing a substrate having a sharp edge would have been obvious to one of ordinary skill in the art as a means of properly adhering the cantilever to the support.

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13. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,245,863 (Kajimura et al.) in view of "Small Cantilevers for Force Spectroscopy of Single Molecules" (Viani et al.) as applied to claim 11 above, and further in view of US 5,319,961 (Matsuyama et al.).

With respect to the limitations of claim 15, the combination of Kajimura et al. in view of Viani et al. disclose all of the limitations of the base claim, but fail to disclose that the support is provided with a sharp edge that is located a distance from a back side of the cantilever tip, the distance being determined such that during application of the reflectance material the area on the back side of the cantilever tip and the sloping boundary are formed.

Matsuyama et al. disclose a cantilever chip for use in scanning probe microscopes, comprising: a cantilever (16) attached to a substrate (12). In one embodiment, as shown in Figure 2J, the substrate (12) is provided with a sharp edge that is located a distance from a back side of the cantilever tip. The arrangement of the support would appear to allow formation of a reflectance material on the back side of the cantilever above the cantilever tip. Providing a substrate having a sharp edge would have been obvious to one of ordinary skill in the art as a means of properly adhering the cantilever to the support.

14. Claims 18 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,245,863 (Kajimura et al.) in view of US 5,753,912 (Matsuyama).

With respect to the limitations of claims 18 and 24, Kajimura et al. disclose all of

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the limitations of the base claim and intervening claim 17, but fail to disclose that the recessed part of the support is partly-octagonal.

Matsuyama discloses a cantilever chip comprising a support section (4) for supporting a cantilever (6). The support section has a recessed portion (16) narrowing in the direction towards the cantilever. Additionally, in an alternative embodiment, Figure 3D, the recessed portion of the support body is shaped as an irregular hexagon, which is deemed to represent Applicants claimed partly-octagonal shape, given that Applicants' disclosed shaped has is also an irregular hexagon. Providing a hexagonal face of a cantilever support would have been obvious to one of ordinary skill in the art because Matsuyama teach use of a hexagonal support having all the same advantages of a conventionally shaped cantilever support.

15. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,245,863 (Kajimura et al.) in view of US 6,365,895 (Yamamoto).

With respect to the limitations of claim 19, Kajimura et al. disclose all of the limitations of the base claim, but fail to disclose that the cantilever comprises a step-like portion which is arranged near the end of the cantilever which is attached to the support, the step-like portion substantially increasing a thickness of the cantilever on a front side of the cantilever.

Yamamoto discloses an apparatus for measuring a micro surface configuration utilizing a cantilevered probe (1). The probe is formed of a single material and comprises a pointed tip section (1a), a beam portion (1b), and a proximal portion (1c)

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that is mounted to a support table (4). As shown in the figures, the proximal portion (1c) of the cantilevered probe (1) has a thickness that is substantially greater than the thickness of the beam portion (1b). Providing a cantilevered probe with a proximal portion having a substantially greater thickness than a beam portion would have been obvious to one of ordinary skill in the art as a means of making the attachment of the probe to the support structure easier.

16. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,365,895 (Yamamoto) in view of US 5,245,863 (Kajimura et al.).

With respect to the limitations of claim 19, Yamamoto discloses all of the limitations of the base claim, but fail to disclose that the cantilever comprises an area of high reflectance material, which area has a boundary sloping towards the support.

Kajimura et al. disclose an atomic force microscope and method of manufacturing one, comprising: a cantilever assembly for scanning a sample (12), comprised of: a cantilever (16) having a cantilever tip (14), the cantilever being mounted to a rigid support (17) and being provided with an area (18) of high reflectance material on the back side of the cantilever. The area (18) appears to have a boundary sloping towards the support (17). Providing an area of high reflectance to the back of a cantilever would have been obvious to one of ordinary skill in the art as a means of providing an accurate detection mechanism for the cantilever deflection, which is the standard detection method used.

Allowable Subject Matter

17. The following is a statement of reasons for the indication of allowable subject matter:

Prior art was not relied upon to reject claims 16 and 22 because the prior art fails to teach and/or make obvious the following:

Claim 16: Providing a cantilever assembly having a support comprising a guidance and calibration structure for guiding and calibrating an optical tracking system in focusing on the area of the high reflectance material in combination with all of the limitations of the base claim.

Claim 22: Providing a process of manufacturing a cantilever assembly having the structural relationship between the diameter of an aperture material source, the length of the extension of the boundary of the area of the reflectance material and the distance between the source and an edge of a cantilever support in combination with all of the remaining limitation of the claim including the base claim.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL S. LARKIN whose telephone number is (571)272-2198. The examiner can normally be reached on 8:30 AM - 5:00 PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel S. Larkin/
Primary Examiner, Art Unit 2856
04 June 2009